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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/753,885	01/07/2004	Jyrki Mikkola	02709/0200717-US0	6893

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EXAMINER

LIE, ANGELA M

ART UNIT	PAPER NUMBER
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2821

DATE MAILED: 05/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/753,885

Applicant(s)

MIKKOLA, JYRKI

Examiner

Angela M. Lie

Art Unit

2821

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 January 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-9 and 11-13 is/are rejected.
- 7) ☒ Claim(s) 2 and 10 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 January 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 01/07/2004, 05/12/2004, 04/22/2004
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Objections

1. Claims 1, 13, 7 and 12 are objected to because of the following informalities:

As to claims 1 and 13, the usage of the phrase "galvanically isolated" is not clear. The applicant shall explain the meaning of this phrase in the body of the specification. An examiner will disregard this phrase in order to be able to examine claims 1 and 13; therefore it is understood from claims 1 and 13 that "a radiating element is isolated from other conductive parts of the radio device".

Appropriate correction is required.

As to claim 7, the phrase "extrusion piece" is not explained in the specification, therefore it is not clear of what the applicant meant by this phrase. The applicant shall explain the meaning of this phrase in order to make the language of the claim 7 clear. Appropriate correction is required.

Drawings

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the radiating parasitic element as described in claim 12 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure

number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-3, 8 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tarvas et al (US 6252552) in the view of McNamara (US 6862437).

As to claim 1 and 13, Tarvas et al teach a planar antenna structure for a radio device having at least one operating band and comprising a ground plane (Figure 11a, element 1107), radiating element (Figure 11a element 1101), feed element (Figure 11a,

element 1108), feed circuit (it is inherent feature that feed element is connected to the feed circuit in order to supply AC signal) and an antenna port (Figure 12, element 1209), wherein the radiating element is isolated from other conductive parts of the radio device (as shown in figure 11a, radiating part 1101 is isolated from other conducting parts such as 1107 or 1109), there is an electromagnetic coupling (column 1, lines 43 - 46) between the radiating element (Figure 11a, element 1101) and feed element (Figure 11a, element 1108) to transfer transmitting energy to field of radiating element and receiving energy to field of the feed element (the fact that feed element transfers an energy to the radiating element and receives incoming signal is an inherent feature of feeding element), the feed circuit connects an antenna feed point in the feed element (Figure 12 element 1207, since this element is connector block and it function as part of the feed line, it is considered a feed element, and this element is also part of an antenna, because without this element antenna could not function) to the antenna port (Figure 12 element 1209) and a ground plane (Figure 12, element 1202) in order to set at least one operating band to a desired range on the frequency axis and to match the antenna (since the connection between radiating element and the ground plate has a certain capacitance, it influences the resonant frequency as well as matching of an antenna, which depends on the resistance and if length of the conductive connector varies, impedance of this component will also change, therefore those two features such as resonant frequency and match of the antenna are inherent features for the configuration described above, column 7 lines 48-65). Tarvas et al do not teach that feed circuit is reactive. McNamara teaches using reactive elements in the circuit such as transistors to

change capacitance and inductance of the circuit so that there is multiple frequencies switching and matching. It would have been obvious to one of the ordinary skill in the art during the time when the invention was made to incorporate McNamara's feeding reactive circuit into Tarvas et al antenna because reactive circuit elements of each of the tuning circuits are readily fabricated in small sizes when fabricated on an MMIC as a single unit. The combined ability to change inductance and capacitance, the preservation of low voltage DC switching operation, and a simplicity and small size of the invention enables fabrication of a multiple band RF switching device in the single MMIC (column 7, lines 5-16).

As to claim 2, Tarvas et al teach a feed circuit board (Figure 12 element 1207) between the feed element and ground plane (column 7 lines 8-16, in lines 13 it is written that feed pin comprises a microstrip on the surface of the connector block, this is interpreted as being a circuit board, connector is a rigid piece and it forms board while a microstrip is a circuit, from this it would have been obvious to one of the ordinary skill in the art that this indeed is a type of the circuit board).

As to claim 3, Tarvas et al also teach a planar antenna wherein to provide two separate operating bands, there is in the feed circuit board (Figure 12 element 1207) a feed conductor which galvanically connects the feed point (Figure 12 element 1206, column 7 lines 48-65, it is stated in this paragraph that an additional dimensioning can increase the impedance bandwidth, it does not say anything about making a galvanically fed antenna becoming a dual frequency after changing dimensions therefore it can be deduced that galvanically fed antenna is dual frequency prior any

changes regarding dimensions) to the antenna port (Figure 12 element 1209), and a ground conductor which electromagnetically connects (since as shown in figure 12, elements 1206 and 1208 through which feeding and ground conductor flows are not touching each other, therefore one of ordinary skill in the art can that the ground conductor is capable of electromagnetically connecting the feed conductor to the ground plane) the feed conductor to the ground plane at an intermediate point in the feed conductor.

As to claim 8, Tarvas et al teach a planar antenna structure comprising a dielectric layer (Figure 7, element 701) above the ground plane (Figure 7, element 703) with a radiating element (Figure 7, element 702) on surface of the layer and a feed element (Figure 7, element 705) on the opposing surface thereof (as shown in figure 7).

5. Claims 5-7, 9 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tarvas et al (US 6252552) in the view of McNamara (US 6862437) and further in the view of Kaiponen (US 6469673).

As to claim 5, Tarvas et al and McNamara teach all the limitations presented in claim 1, they do not teach however that the radiating element, when installed, follows the contours of the outer surface (Figure 2, element 103a) of the radio device as regards its shape and position (as shown in figure 2, element 106, note that in specification this element corresponds to the number 206). It would have been obvious to one of the ordinary skill in the art during the time when the invention was made to incorporate Kaiponen's placement of a radiating element so it follows the shape of a

surface of the radio device, into the antenna as described in claim 1, because if the radiating element follows the shape of surface of the radio device, it would be one of the most efficient ways of using the space inside the radio device, and while keeping size of the device relatively small, radiating plane could still have big size what would lead to better radiation and receiving of a signal.

As to claim 6, Tarvas et al, McNamara and Kaiponen teach all the limitations presented in claim 5. Kaiponen teaches also that the radiating element is a rigid conductive piece belonging to a cover of the radio device (as shown in figure 2, Kaiponen does not explicitly state that radiating element is a rigid component and that it is conductive, however the fact that radiating element is conductive is an inherent feature, because the radiating element in order to radiate it has to be conductive, and in regard to radiating element being rigid, it is also obvious from the figure 2, because if radiating element (Figure 2 element 106) would not be rigid, it could not be placed in parallel with ground plane and stay separated by itself because it would unstable). The radiating element also belongs to a cover of radio device (as shown in figure 2, element 106, 103a and 103b).

As to claim 7, Tarvas et al, McNamara and Kaiponen teach all the limitations presented in claim 6, Tarvas et al also teach that the conductive piece is an extrusion piece (column 8 lines 1-4, it is mentioned in this paragraph that radiating element can be a curved piece, therefore in order to make that shape it had to be extruded, if the extrusion is understood as one piece element it also shown in figure 11a that radiating element is one piece element).

As to claim 9, Tarvas et al and McNamara teach all the limitation presented in claim 8, they do not teach however that plate formed by (understood as plate comprising) the dielectric layer, radiating element and feed element are arranged to be attached to an inner surface of a non-conductive cover of the radio device. Kaiponen teaches an arrangement in which all the part of the antenna listed above is attached to the non-conductive portion of the radio device (column 2 lines 2-26). It would have been obvious to one of the ordinary skill in the art during the time when the invention was made to mount the antenna as described by Tarvas et al by attaching it to an inner surface of a non- conductive cover as taught by Kaiponen, because placing antenna inside the housing definitely protects it from being broken or destroyed, and further the inner surface of the case should be non-conductive because a radiating element in the antenna should not touch the conductor since that could cause degradation in the signal (column 2 lines 24-16).

As to claim 11, Tarvas et al, McNamara and Kaiponen teach all the limitations presented in claim 5. Kaiponen also teaches at least one of the radiating element (Figure 2 element 106) and feed element (Figure 2 element 207) being located inside the cover of the radio device (Figure 2 elements 103b and 103a).

6. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tarvas et al (US 6252552) in the view of McNamara (US 6862437) and further in the view of Tarvas et al (US 6759989). Tarvas et al and McNamara teach all the limitations presented in claim 1, they do not teach however that the planar further comprising at least one radiating parasitic element. Tarvas et al (US 6759989) teach placing a

Art Unit: 2821

parasitic element to improve upper operating band. It would have been obvious to one of the ordinary skill in the art during the time when the invention was made to incorporate Tarvas et al teaching and place a parasitic antenna in the antenna setup described in claim 1, because parasitic antenna increases the width of radiation and therefore it improves upper operating band and the overall signal coverage is better (US 6759989 column 1, lines 52-67 and column 2 lines 1-7).

Allowable Subject Matter

7. Claims 4 and 10 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. The following is a statement of reasons for the indication of allowable subject matter:

As to claim 4, the Prior Art failed to disclose that the feed conductor and ground conductor are meandering strip conductors, as clearly described in the body of claim 4

As to claim 10, the Prior Art failed to disclose the radiating element being a conductive layer on an outer surface of the cover of the radio device as clearly described in the body of claim 10.

The Prior Art

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- US 6683573 discloses a multi band chip antenna with dual feeding ports, it does not talk about feed circuit board

Art Unit: 2821

- US 2002/0089453 discloses a multi frequency band antenna
- US 5926139 discloses a planar dual frequency band antenna
- US 6404394 discloses a dual polarization slot antenna assembly.


Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Angela M. Lie whose telephone number is 571-272-8445. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Don Wong can be reached on 571-272-1834. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

AL


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